NOTES

Notes on the Hawaiian Flora

BENJAMIN C. STONE[1]

IN THIS REPORT on various Hawaiian plants are gathered taxonomic and nomenclatural notes which have accumulated over several years. Certain new taxa, some nomenclatural adjustments, comments on noteworthy collections, and distribution records are presented.

CYPERACEAE

An Additional Species of Cyperus *in Kauai*

Cyperus haspan L. Kauai: Wahiawa Bog, 2 January 1957, *Stone* 1665 (BISH). Det. T. Koyama. New to Kauai; known also (collected once, recently) from Hawaii. Evidently an adventive species; its distribution is very broad.

PAPAVERACEAE

Authority for the Hawaiian Argemone

In his monograph of the genus *Argemone* in South America and Hawaii, G. B. Ownbey cites the Hawaiian species as *Argemone glauca* L. ex Pope, Man. Wayside Pl. Haw., p. 71, pl. 32, 1929, adding the remark "as 'Argemone glauca Linnaeus' in error." This was indeed as Pope published the species. It is manifest from Pope's writing that he believed that *A. glauca* had previously been described by Linnaeus, and he presumably did not check on this assumption. In fact, Linnaeus published no such species. Pope clearly did not intend a new epithet. He also seems to have been unaware of the valid varietal name *glauca* published by Prain, in J. Bot. 33:329, 1895, with Nuttall indicated as the source. However, Pope may have seen this publication, and, retaining in memory the epithet, forgot its rank and place of publication; or perhaps the glaucous appearance of the plants in question simply suggested the same epithet. We also find Degener, in Plants of Hawaii National Park, p. 164, 1930, using the name *Argemone glauca,* but as a provisional name and hence not a formal nomenclatorial usage; and later in Flora Hawaiiensis (31 July 1958) where, with a long list of synonyms, the name is given as "*Argemone glauca* (Prain) Deg. & Deg. comb. nov." Ownbey considers that this transfer is contrary to Article 32 of the International Code of Botanical Nomenclature (1956 ed.). There seems to be no good reason to invoke Art. 32, however, which in itself offers no reason to consider as incorrect the author citation as suggested by the Degeners. Ownbey himself seems to perpetuate the idea that Pope was "attributing" the name to Linnaeus. This is a practice that has been used at times, but it has nothing to recommend it and in this case is clearly not supported.

We are forced to conclude that Pope's description, although definitely *not* intended as a proposed new name and species, can be taken *as if* he had proposed a new species. He is definitely the first to publish the binomial *Argemone glauca.* He does furnish a good description; since it was published in 1929, he did not have to include a Latin description. He cited no specimens and no holotype; but citation of type is required only after 1 January 1958. He does furnish an illustration. There is no difficulty at all in interpreting his meaning. Consequently we can accept his publication as if it were describing a new species, and thus the correct citation of the name is: *Argemone glauca* Pope, Man. Wayside Pl. Haw. p. 71, pl. 32, 1929 (attributed in error to Linn.).

A neotype should now be chosen for this species. The new combination by the Degeners,

[1] Department of Botany, University of Malaya, Kuala Lumpur. Manuscript received June 15, 1966.

though technically correct, is superfluous, as priority is by rank.

MALVACEAE

A Synonym for the Hawaiian Hibiscus clayii

In Sister Roe's study of the Hawaiian species of *Hibiscus* (Pacific Sci. 15:3–32, 1961) a new species from Kauai is described and named *Hibiscus newhousei* for its discoverer, W. Jan Newhouse. It was first located in the foothills of the Moloaa Forest Reserve at near 500 ft altitude, and has been collected by I. E. Lane (no. 58-44, 10 November 1958) and by the writer (*Stone* 3420, 3421, 15 April 1960), in company with Tadayuki Kato. I find, however, that this species is synonymous with *Hibiscus clayii* Deg. and Deg. (Flora Hawaiiensis fam. 221, 20 March 1959), which was described from cultivated plants grown from cuttings long since taken from Haiku, Kauai, by Albert Duvel.

Hibiscus clayii Deg. and Deg.

Hibiscus newhousei Roe, syn. nov.

Kauai: Moloaa, mountains ssw of Moloaa, Moloaa stream and waterfall, alt. about 700 ft, 15 April 1960, *Stone* 3420 (flowering), 3421 (fruiting) (BISH).

A small grove of perhaps six plants was found, on vertical rocky banks just above a small waterfall. The trees approached 25 ft in height; some were in flower, and one bore several mature fruits, each in the form of a five-pointed star, the segments follicular, and bearing normal seeds. The flowers were dark-red in color. Associated species included *Cordyline fruticosa, Aleurites moluccana, Pleomele aurea,* and *Eleocharis* sp.

Two Other Recent Collections of Hibiscus

Hibiscus saintjohnianus Roe

Kauai: Na Pali Coast, trail to Kalalau Valley, rim of Hanakoa Valley at about 800 ft alt., 14 August 1961, *Stone, Stern and Carlquist* 3748 (bright orange flowers), 3749 (darker reddish-orange flowers) (BISH).

Hibiscus sp. (perhaps *H. arnottianus,* forma)

Oahu: Waianae Mountains, Palikea trail, alt. 1,500 ft, dry gully, 5 May 1960, *Stone* 3471 (BISH). This collection, taken from a largish tree about 30 ft high, has baffled certain determination because it lacked flowering branches. However, it may be a form of *H. arnottianus,* probably f. *parviflora* Skottsberg. The leaves had light-magenta-colored midribs and veins, purplish and sparingly puberulent petioles (the pubescence stellate), and small subulate reddish soon caducous stipules. The importance of this collection is in showing the species in such a dry locality among almost nothing but weeds.

EUPHORBIACEAE

Two New Taxa in Aleurites

The *kukui* or candlenut tree, *Aleurites moluccana,* is a familiar plant in the Hawaiian landscape, its pale foliage distinct even at long distances and indicating the groves and isolated trees so common at moderate elevations on the Hawaiian mountains and in valleys. It is generally agreed that the plant is one of the aboriginal introductions of the Hawaiians, since it figured largely in the Polynesian culture throughout the high islands of Polynesia, and indeed is a valuable tree for the people of many other Pacific islands. It is known to be planted in groves around many Hawaiian village and temple sites, along trails, and around present-day houses as well. Although surely widespread in Hawaii through natural means, it is also distributed deliberately (or has been in the past), and perhaps also accidentally, since the seeds may be carried easily and perhaps dropped. In other words, it is a plant that is marginally a cultivated plant. Because it was of some importance (for torches, made from the oily seeds; for medicinal purposes, the seeds being somewhat purgative in small doses and violently so in larger ones; and for food, either raw or preferably cooked), the early Hawaiians no doubt took an interest in the trees just as they did in their selections of taro varieties (*Colocasia*), ti varieties (*Cordyline*), bananas, and other plants. This would lead to an observance and to a deliberate selection of unusual forms among the *kukui* trees, as it did with other plants of cultural interest. This selection would tend to perpetuate forms which might otherwise disappear (as for instance at the demise of a particular tree with a remarkable recombination

type), and it would account for the spread of such a remarkable type from island to island.

A few years ago just such an unusual *kukui* was described as a species, *Aleurites remyi* Sherff (Field Mus. Bot. ser. 17:558, 1939) from specimens collected long ago by Jules Rémy (1851–55), apparently somewhere near Kona, Hawaii. Additional collections and good photographs of the leaves were published by Sherff in a later paper (Am. J. Bot. 31:157, pls. 1–3, 1944), and definite localities then were known: Holualoa-Kailua road, North Kona; and a garden in Hilo. A plant was grown from a seed by Dr. Sherff in Chicago. However, according to Mrs. Thomas Jaggar, the Kona tree (or trees) were supposed to have been brought to Hawaii from Kauai (as a nut) and was known locally as the "Kauai" or "mango-leaved" *kukui* or, because of the Kona locality, as the "Kona" *kukui.*

More recently, another unusual *kukui* has been discovered, nearly simultaneously, by Dr. Otto Degener and by Tadayuki Kato on Kauai. Like the "Kona" form, it differs from the common *kukui* in its strikingly different leaves. An individual of this form may be seen on the grounds of Kauai High School in Lihue.

In fact, these two forms have a common tendency, i.e., a relative lengthening of the leaf and reduction or loss of the lateral lobes. In *A. remyi* the lateral lobes are very narrow, the terminal lobe much elongated; in the Kauai High School form the lateral lobes are reduced or absent. In reasonably typical *A. moluccana* proper, the lateral lobes are present and rather broad, and the terminal lobe is not particularly longer. For comparison the sketches in Figure 1 are given. It will be noticed that even in *A. moluccana* proper there is a marked variation in extent of lobing.

In describing *A. remyi* Sherff states: "Several staminate inflorescences have been seen. They appear different from those on *A. moluccana,* with which *A. Remyi* will stand in the section Camirium. . . . However, the floral characters of *A. moluccana* are so lacking in sharp delimitations that much reliance upon them for a distinction from *A. Remyi* seems for the present unwise. *A. Remyi* has slightly smaller petals (for its staminate flowers) and these are often sharply 1-denticulate on each margin close to their expanded distal portion, which in turn is very often irregularly obtuse-denticulate or -lobulate. In *A. moluccana* the tendency is for

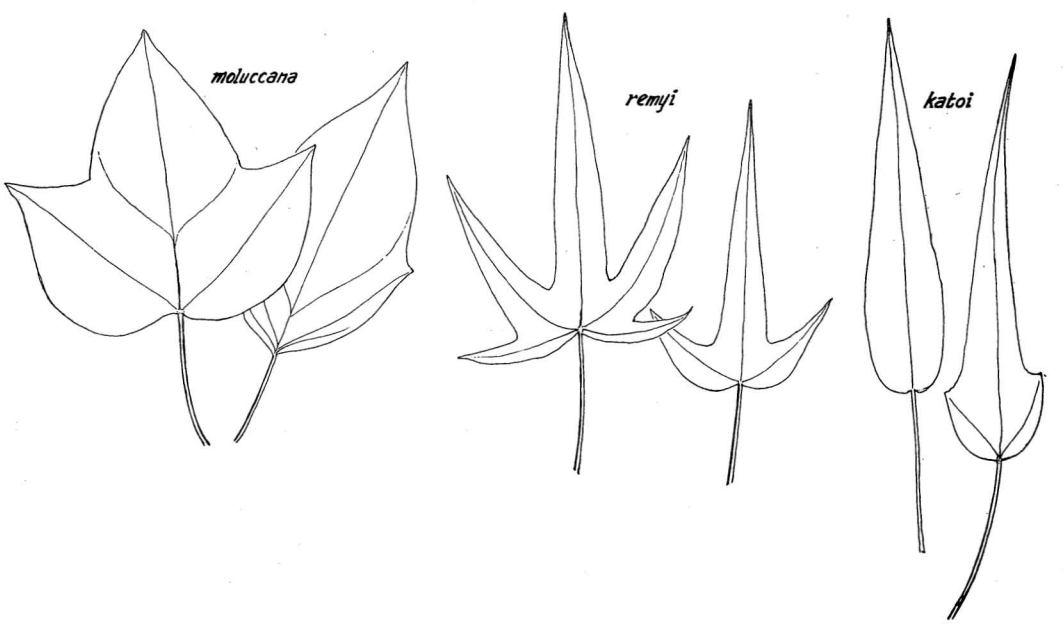

FIG. 1. Leaves of *Aleurites moluccana* in Hawaii. *Left* to *right*: var. *moluccana*; var. *remyi*; var. *katoi*. Not to scale.

the petals to be entire or essentially so." While agreeing that some minor variation in petals does occur it should be added that this is not of any great importance. In short, the discrimination of species is made on the leaf characters alone.

Knowing the somewhat cultivated nature of the Hawaiian *kukui,* and having now a reasonably accurate radio-carbon date from archaeology that shows that the Hawaiian Islands were probably populated rather less than 2,000 years ago, I find it unlikely that *A. remyi* can be considered an endemic native Hawaiian species. In addition, the examination of flowering material of many specimens of *A. moluccana,* including the Kauai High School form, fails to reveal any additional differentiating characters. In conclusion, it appears preferable to treat these forms as subspecific taxa and to suggest that, in fact, they are of aboriginal Hawaiian selection.

The Hawaiian *kukui* trees, then, can be arranged as follows:

Aleurites moluccana (L.) Willd. (syn. *A. triloba* Forst.)

(1) var. *moluccana.* This is the common form not only in Hawaii but elsewhere in the range of the species.

(2) var. *remyi* (Sherff) B. C. Stone, stat. nov.

A. Remyi Sherff, Field Mus. Bot. ser. 17:558, 1939; Am. J. Bot. 31:157, pls. 1–3, 1944.

HOLOTYPE: *Rémy* 600, pro parte (3 sheets, Paris). Although this may be from Kauai, the locality at present known is North Kona, Hawaii. As a common name "Remy's kukui" is suggested.

(3) var. *katoi* Degeners and Stone.

The formal description of this variety will appear in the Flora Hawaiiensis, vol. 7. It is named for Mr. Tadayuki Kato of Kauai High School, who has been very helpful to me and to other visiting botanists. The holotype specimen, taken from the tree on the grounds of Kauai High School in Lihue, is at the Bishop Museum (*Stone* 3427, collected on 15 April 1960). A further specimen collected by Dr. Degener is also available. A suitable common name would be "Kato's kukui" or, alternatively, the "mango-leaved kukui."

ARALIACEAE

A Recent Collection of Munroidendron racemosum

The genus *Munroidendron* Sherff (Bot. Leafl. 7:21, 1953; Am. J. Bot. 43:476, 1956) is of particular interest because it is endemic in Hawaii, consisting of a single species which is very rare. It was rediscovered a few years ago by Tadayuki Kato, of Kauai, and a small collection was made later by a party (the writer, with William Stern and Sherwin Carlquist) that found *Munroidendron* in the Nonou Range not far from the Wailua River, Kauai, on the west side at about 700 ft alt. in the second valley from the south end of the range. The trees were leafless at the time (16 August 1961), but were in flower, the long racemose inflorescences hanging from the rather thick bare branches. A photograph was taken but is not particularly good (Fig. 2). The specimen (*Stone* 3768) is in the Bishop Museum. The single tree seen was on a relatively steep arid slope facing west,

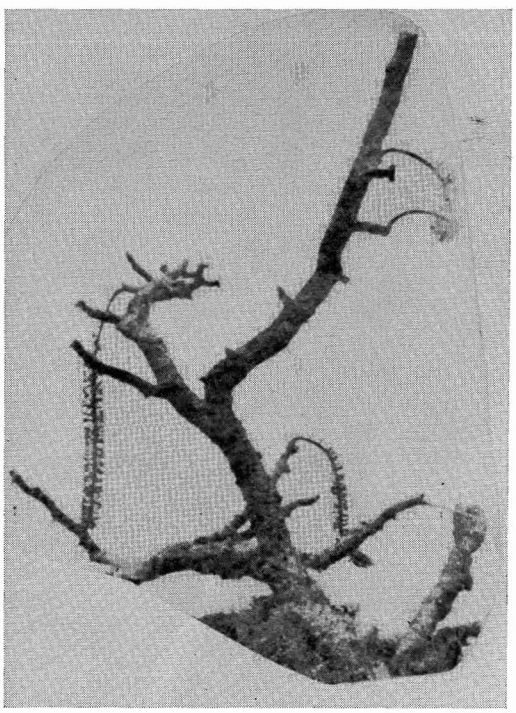

FIG. 2. *Munroidendron racemosum* (Forbes) Sherff; habit of a tree on Nonou Mountains, Kauai (Stone 3268).

associated with such species as *Canavalia galeata, Sida* sp., *Plectranthus australis, Mucuna gigantea, Aleurites moluccana, Cordyline fruticosa, Psidium guajava, Lantana camara,* and other aridity-tolerant plants, many of them weedy introduced species. The tree, with its leafless appearance and numerous dry, decayed branches, had an unhealthy aspect. It should be sought in a season when fruits are ripe so that seeds may be gathered for the preservation of this very interesting species, now perhaps nearly extinct.

APOCYNACEAE

The "Kalaipahoa" Tree of Wahaula Heiau, Hawaii, Is Rauvolfia

During a survey performed by members of a Bishop Museum expedition for the U. S. National Park Service in Kalapana, Puna, Hawaii in the summer of 1959, a single tree of *Rauvolfia remotiflora* Degener and Sherff was found at Wahaula Heiau, near the coast and not far from Kalapana village. This tree, called "kalaipahoa," was discovered by S. Konanui and J. Halley Cox. Supposedly in earlier times, during the ascendancy of this heiau, a grove of trees existed, and this one is a remnant of the grove, which was said to contain many kinds of plants useful to the priests. Another collection was made higher on the dry slopes of Kealakomo in native forest (*Stone and Pearson* 3016, alt. 1,400 ft. 9 July 1959, BISH). The same species has previously been recorded from two localities in the Kau District (at Waiohinu and near Kaalualu) in Sherff's treatment of 1947 (Field Mus. Bot. ser.). The possibility that the heiau's priests used this plant suggests that they might have had some knowledge of the medicinal properties of the milky sap, which in some species (especially *R. serpentina* of India) provides an important drug now well known as reserpine. It would be of interest, therefore, to have the Hawaiian species (which number seven) investigated for this material.

SOLANACEAE

The Identity of Solanum carterianum *Rock*

Rock's description (Indig. Trees Haw. Is. p. 423, 1913), and specimens collected since his discovery of this plant in Hawaii, accord well with a variety of another species: *Solanum verbascifolium* L. var. *auriculatum* (Aiton) O. Kuntze. This appears to have a natural distribution in tropics of both hemispheres, in such regions as Borneo, Sumatra, Java, and Amboina, and has been reported from Tonga. In Hawaii it has been found only in the Waiahole-Waianu Valley on the windward (east) side of the Koolau Range of Oahu. Rock listed a vernacular name ("pua-nanahonua") for the plant, which evidently he took as an indication that it was an indigenous species. This is doubtful, however. The very restricted occurrence of this plant in Hawaii, the fact that so many exotic species have been introduced (not all by known persons or at known times), and the remarkable, even reprehensible, lengths to which introducers of foreign plants have gone in distributing alien species, all tend to support the conclusion that this *Solanum* is an exotic, not a native, species. It may have been introduced about 1900. It is easily distinguished from the truly indigenous species of *Solanum* by its arborescent habit, dense fulvous tomentum, and rather large bluish-lavender flowers. Endemic species, such as *S. kauaiense* Hillebr., are shrubby, and bear white or purplish flowers. Other introduced species are also mostly herbs or shrubs, and inhabit disturbed areas. *S. verbascifolium* is illustrated, under Rock's designation, in Degener's Flora Hawaiiensis.

A New Variety of Nothocestrum (*Solanaceae*)

Nothocestrum longifolium Gray var. *rufopilosum* B. C. Stone, var. nov.

Folia magna elliptica usque ad 16–17 × 6.3 cm, laminis costis nervisque pilis rufis tomentosis sed ultime glabrescentibus, ramulis glabris.

Leaves large, elliptic, up to 17 × 6.3 cm, the blades, costa, and nerves beneath tomentose with rufous hairs, but at last becoming glabrous; branches glabrous.

HOLOTYPE: Hawaii: between Glenwood and Twenty-nine Miles, in wet forest, 24 June 1929, *O. Degener* 7434 (US).

For its species this is an unusually large-leaved plant, the blades densely rufous-tomentose beneath, especially along the midribs and lateral nerves, but in age becoming somewhat glabrate except on the midrib.

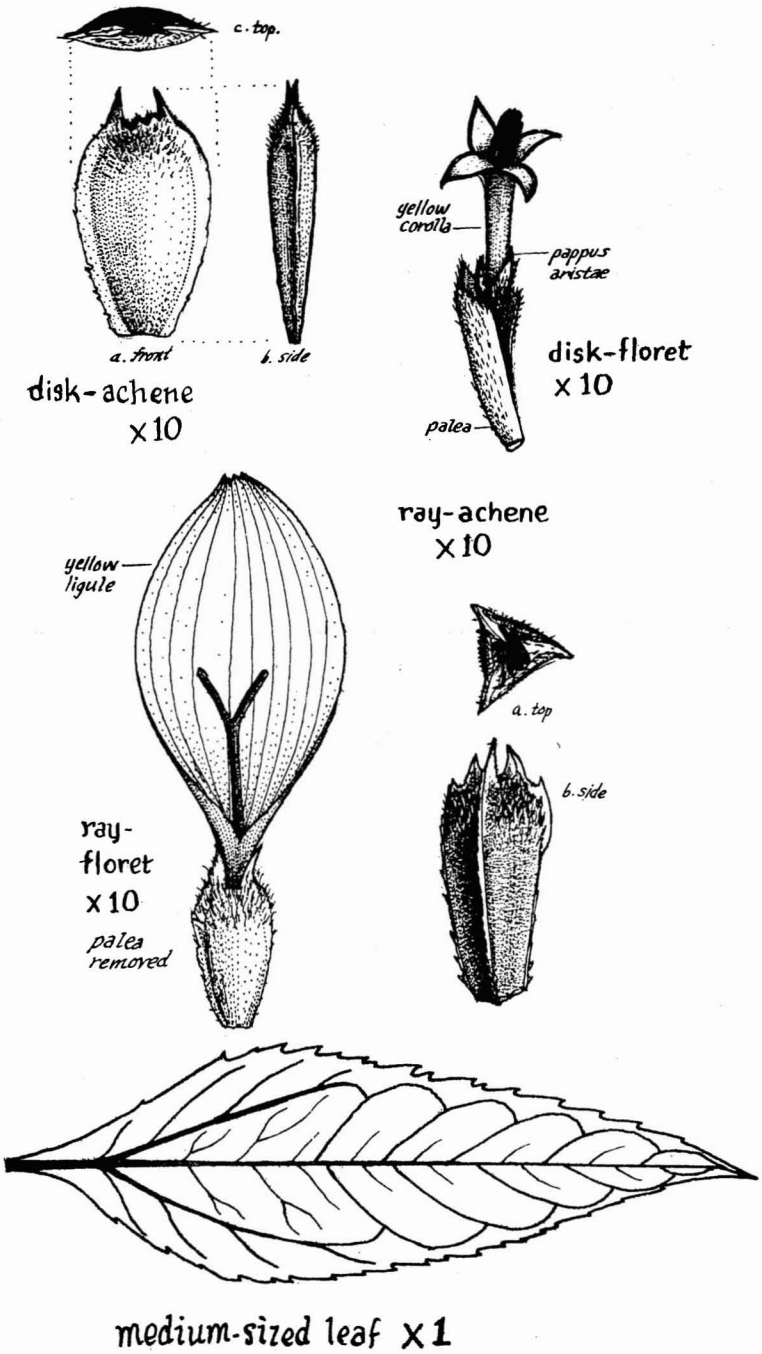

FIG. 3. *Lipochaeta acris* Sherff; leaf, florets (disc- and ray-) and achenes (disc- and ray-). All from Stone 825, Kauai.

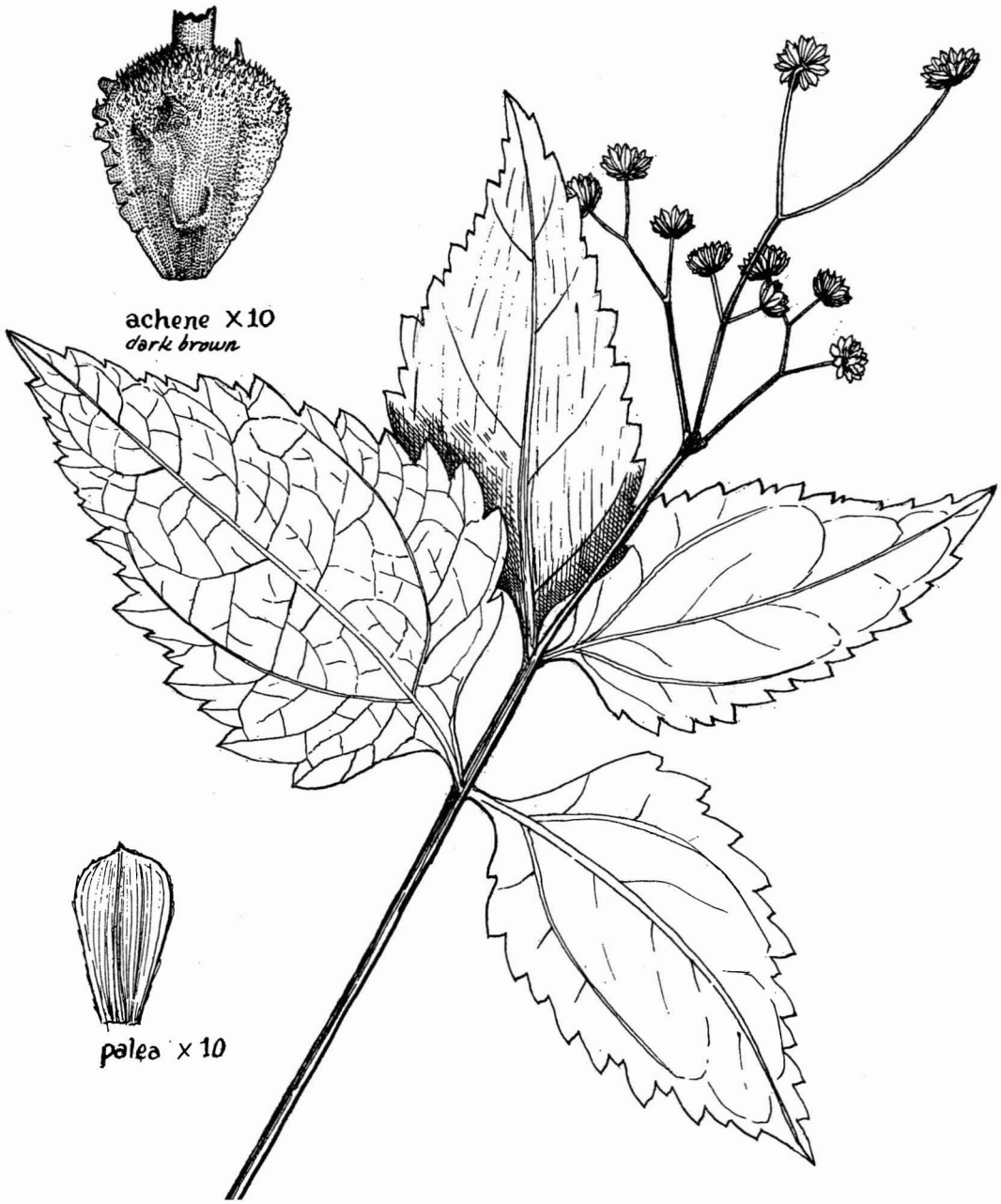

FIG. 4. *Lipochaeta alata* Sherff; habit (× 1), achene and palea. From Stone 760, Kauai.

COMPOSITAE

Rediscovery of Bidens cuneata

In 1959, while I was botanizing on Diamond Head, Oahu, with Dr. Charles Lamoureux of the University of Hawaii, the extremely rare species *Bidens cuneata* Sherff was rediscovered. Previously this had been known only from the original description, based on a single type collection, and had been declared extinct (Dege-

ner, J. Pan-Pacif. Inst. 7(2):3, 1932). But several years ago, Lamoureux and E. T. Ozaki collected it a second time, and the plant appeared to be persisting, not common but not at all extinct. On the last trip about half a dozen individual plants were observed, all within a small area on the northwest rim of Diamond Head (Leahi).

Illustrations of the achenes of two recently collected species of Lipochaeta (*Compositae*).

A number of photographs of herbarium sheets were illustrated in Sherff's monograph (Bish. Mus. Bull. 135, 1935) of the genus *Lipochaeta,* and many good line drawings are found in Degener's Flora Hawaiiensis. To these may be added the following:

Lipochaeta acris Sherff

Kauai: Na Pali Coast, Hanakapiai, 500 ft alt., 18 June 1955, *Stone* 825 (BISH).

Habit illustrated in Degener, Flora Hawaiiensis; the additional illustration here (Fig. 3) shows disc and ray florets and disc and ray achenes.

Lipochaeta alata Sherff

Kauai: Na Pali Coast, Hanakapiai, 500 ft alt., 17 June 1955, *Stone* 760 (BISH). Figure 4 shows habit, achene, and palea.